June 16, 1999

Steve L. Foss
Pesticide Information and Resource Specialist
Washington State Department of Agriculture
Registration & Services Branch
PO Box 42589 Olympia, WA 98504-2589
sfoss@agr.wa.gov
Phone (360) 902-2049
Fax: (360) 902-2093

1. **Is the draft report scientifically sound?** Yes.

2. **Did the ECOFRAM Workgroup address the "Charge to the Terrestrial and Aquatic Workgroups" identified in the background document, "Evaluating Ecological Risk: Developing FIFRA Probabilistic Tools and Processes"?**
   Yes. The Aquatic Workgroup has begun to develop a process and the tools needed to predict the magnitude and probability of adverse effects to nontarget aquatic species resulting from the introduction of pesticides into waterbodies. The methods include procedures that estimate pesticide exposure with knowledge about the potential adverse effects and account for sources of uncertainty.

3. **What are the limitations for predicting risk using the approach described in the draft report?**
   If the risk assessment process proceeds to the Tier 3/Tier 4 level of analysis, then the cost and availability (time) of expert involvement may limit the risk management decision process and resolution of uncertainties. For example: microcosm studies are relatively expensive ($0.2 to $0.5 million), highly variable, time consuming, generate extensive data, and require expert judgement (*Chapter 4- - 133-14-15*). As noted in the report a "Lack of information on variation in species sensitivity is thus a major source of uncertainty in ecological risk assessment (*Chapter 4- - 63:6-7*).

   The GENEEC model estimates environmental concentrations for a pesticide in an edge-of field water body (*Chapter 3- - 27:30-35*). Can this model be used for pesticides applied directly to waterbodies (i.e. Rodeo in estuaries, triclopyr in lakes, endothal/acrolein in canals)? The model prompts a user to enter A for aerial (5% entry/drift), B for ground (1% entry/drift) or C for granular. Will this model need to be adjusted for direct applications (i.e. assume 100% entry)?

4. Specific suggestions to strengthen the report.

A. Risk assessors and risk managers will need to be trained to use the tools and processes recommended *(Chapter 4- - 136-33).*
Agree. It would be very helpful to include a working example to train risk managers. The training process should ensure that risk assessors are able to use the recommended tools and processes for Tier 1 and 2 levels of assessment (i.e. PRZM and GENEEC). An assessor needs to be able to derive Risk Quotients (RQ), Estimated Effect Concentrations (EEC), and specific Level of Concern (LOC) values and use life table analyses, and plot Joint Probability Curves (JPC) inorder to make risk management decisions at the Tier 1 and 2 levels *(Chapter 4- - 134-32-34 through 4- - 135-15-18).*

B. This type of training would assist state risk assessors to better understand data requirements, provide a basis for label restrictions (mitigating measures), and help in the development of state forms and registration guidance documents for individual areas of interest (see additional comments under Question #5).

C. Including URL References/Expert Resource Contacts/Organizations in the ECOFRAM Report would be useful in the education process. The following references could be included in *Chapter 2-47:6-18* or *Chapter 2-48:10-17***.**

Example #1 - URL reference = http://www.agdrift.com/agdrift_web/Agdrift_intro.htm.

Additional information on AgDRIFT : An Update of the Aerial Spray Model AGDISP (Milton E. Teske, Continuum Dynamics, Inc. and Scott L. Ray, Dow AgroServices)
Abstract - The aerial spray prediction model AGDISP has undergone several important changes since its publication in 1989, particularly in its application in AgDRIFT to downwind drift predictions for the Spray Drift Task Force and the U. S. Environmental Protection Agency. This note summarizes these changes, and in the Appendix collects the governing equations.

A copy of four publications on spray drift can be viewed through the following URL reference = http://www.agdrift.com/publications/Body.htm. This could be included as a reference in *Chapter 2-47:6-18*.

Example #2 - URL reference = http://www.droptech.com/co_dt.htm
Droplet Technologies (Dr. Karl Mierzejewski, State College, PA, USA) and the Swath Kit (Dr. Jon Bryant). Jon was active in the Spray Drift Task Force, an industry expert group organized to evaluate the implications of drift from the agricultural use of pesticides. Karl consults in the pesticide application field, concentrating on biological pesticides. He ran the Aerial Application Technology Lab in Penn State's Entomology Department, and for many years chaired the

NorthEastern Forest Aerial Application Technology (NEFAAT) Group, an inter-disciplinary group of scientists, aerial applicators and manufacturers dedicated to improving aerial application in forests. Both Jon & Karl have extensive backgrounds in the aerial application field, and both are pilots. [Contact: Karl Mierzejewski, Droplet Technologies Inc, 937-1 West Whitehall Road, State College, PA 16801 USA, Telephone/Fax: 814-238 1366, Emails : Karlski@csrlink.net]

Example #3 – URL reference =
http://www.agairupdate.com/aau/paass/shape.html
Coordinate with National Agricultural Aviation Research and Education Foundation Professional Aerial Applicators Support System (PAASS) on drift issues. PAADD recognizes that "During the last several years "drift" became a national issue. The Environmental Protection Agency (EPA) has denied air labels for certain agricultural chemical products based on their interpretation of the risks to the environment, sensitive habitats, and specific specie of flora and fauna."

D. Include a Scenario in the ECOFRAM report (Chapter 2-44 – Risk Assessment): How would ECOFRAM evaluate risk and communicate information in the following example? Is chinook salmon at risk based on the monitoring data? If not, then why? Are the reported concentrations of environmental significance when using ECOFRAM process and tools?

When "there is increasing interest in the monitoring…of pesticide exposures in surface water (Chapter 3-16:14-32)", then probabilistic assessments of ecological risk would be useful in responding appropriately to pesticide detections.

For example: Refer to the following news article "Pesticide Diazinon Found In Nine Out Of Ten King County Neighborhood Streams", Seattle, WA – March 11, 1999 –
URL reference: http://splash.metrokc.gov/dnradmin/press/990311Diazinon.htm

"Scientists found the pesticide diazinon in tested urban and suburban streams throughout King County neighborhoods in a sampling project conducted last spring. In all but one of ten streams, the concentration of diazinon exceeded standards for long-term exposure of aquatic life. ***This leads to concern about possible effects on the threatened chinook salmon¼****. Scientists have previously expressed concern at the high levels of diazinon that continue to be found in local streams. They have suspected long-term harm to fish and other aquatic life. There has also been concern about the effect on birds that feed on crane fly larvae.*

The sampling project was a partnership effort of the U.S. Geological Survey, the Washington Department of Ecology and the King County Hazardous Waste Management Program. The samples were taken during rainstorms in April and May of 1998 as part of a long-term effort to monitor pesticides in area streams.

The above article was based on U.S. Geological Survey Fact Sheet 097-99, April 1999 **"**Pesticides Detected in Urban Streams During Rainstorms and Relations to Retail Sales of Pesticides in King County, Washington [URL reference http://wa.water.usgs.gov/pugt/fs.097-99/index.html]

"Environmental Significance

"Fourteen of the pesticides detected in this study have maximum recommended concentration limits for protection of aquatic life established by the NAS/NAE (1973), or the Canadian Council of Resource and Environment Ministers (1987). The limits were exceeded by sample concentrations of five insecticides--carbaryl, chlorpyrifos, Diazinon, Lindane, and Malathion (fig. 3). Eleven of the pesticides detected in this study have chronic aquatic life criteria recommended by Norris and Dost (1991), the U.S. Environmental Protection Agency (1998), and others. These limits were exceeded by concentrations of Lindane, Diazinon, and simazine. The aquatic-life criteria indicate concentrations that can adversely affect aquatic organisms. However, the ecological effects in the streams sampled are unknown because the duration of exposure to concentrations observed and the combined effects of many pesticides in stream water are unknown."

E. Convenient software needs to be developed to allow routine and uniform application of time- to- event analysis and joint probability approach (Chapter 4- - 136-30-32).

Agree. Can EPA provide this software on the web?

F. How have regulators decided which "types" of water bodies should be protected (Comment to major issue - Chapter 2-52:1-4)?

The water typing system used in Washington's forest practices rules is based on beneficial uses, one of which is fish [see **Water typing system-** WAC 222-16-030; URL Reference = http://www.wa.gov/dnr/htdocs/fp/fpb/watertypemar99.html]**.**

**The department (Washington State Department of Natural Resources) in cooperation with the departments of fisheries, wildlife and ecology, and in consultation with affected Indian tribes shall classify streams, lakes and ponds and prepare stream classification maps showing the location of Type 1, 2, 3 and 4 Waters within the various forested areas of the state. Such maps shall be available for public inspection at region offices of the department. The waters will be classified using the following criteria. If a dispute arises concerning a water type the department shall make available informal conferences, which shall include the departments of fisheries, wildlife and ecology, and affected Indian tribes and those contesting the adopted water types. These conferences shall be established under procedures established in WAC 222-46-020.*

For example:

*(3) **"Type 3 Water"** shall mean segments of natural waters, which are not classified as Type 1 or 2 Water and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands which:*

(a) Are diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility licensed to serve more than 10 persons, where such diversion is determined by the department to be a valid appropriation of water and the only practical water source for such users. Such waters shall be considered to be Type 3 Water upstream from the point of such diversion for 1,500 feet or until the drainage area is reduced by 50 percent, whichever is less;

(b) Are used by significant numbers of anadromous or resident game fish for spawning, rearing or migration. Guidelines for determining fish use are described in the Forest Practices Board Manual. If fish use has not been determined:

(i) Waters having the following characteristics are presumed to have significant anadromous or resident game fish use:

(A) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington; or 3 feet or greater in width between the ordinary high-water marks in Eastern Washington; and having a gradient of 16 percent or less;

(B) Stream segments having a defined channel of 2 feet or greater in width between the ordinary high-water marks in Western Washington; or 3 feet or greater in width between the ordinary high-water marks in Eastern Washington; and having a gradient greater than16 percent and less than or equal to 20 percent; and having greater than 50 acres in contributing basin size in Western Washington or greater than 175 acres in contributing basin size in Eastern Washington, based on hydrographic boundaries;¼ ¼ ¼ ¼ ¼ ¼ ¼

G. Assist Environmental Decision Makers with a Process through Tiers

For example: Reviewers in the Washington State Department of Natural Resource use the following process to make an environmental decision related to requests for aerial application of pesticides in forests, which may have the potential for a substantial impact on the environment (see WAC 222-16-070). Perhaps ECOFRAM could develop a key to guide decision makers through the tiers (Chapter 3-31:16) and/or triggers (see Chapter 4 –109:25-33).

*To identify forest practices involving pesticide uses that have the potential for a substantial impact on the environment, the department shall apply the process prescribed in this section. See WAC 222-16-050 (1)(a).

(1) Pesticide list - The department shall maintain a list of all pesticides registered under chapter 15.58 RCW for use in forest practices. The department shall conduct, in consultation with the departments of ecology, health, agriculture, and fish and wildlife, an annual review of the list for the purpose of including new pesticides and/or removing those pesticides, which have been prohibited from use. The list shall be available to the public at each of the department's offices. A list of the department's offices and their addresses appears at WAC 332-10-030. In preparing the pesticide list, the department shall include information on the following characteristics:
(a) Active ingredients, name brand or trade mark, labeled uses, pesticide type, EPA-registration number;
(b) Toxicity of the pesticide based on the Environmental Protection Agency (EPA) label warning under 40 C.F.R. 156.10 (h)(1), listed as "caution," "warning," "danger," or "danger - poison" except as modified to consider aquatic or mammalian toxicity; and
(c) Whether the pesticide is a state restricted use pesticide for the protection of ground water under WAC 16-228-164(1).
(2) Key for evaluating applications. To determine whether aerial application of a pesticide has the potential for a substantial impact on the environment, the department shall apply the following analysis:

KEY FOR EVALUATION OF SITE SPECIFIC USE OF AERIALLY APPLIED CHEMICALS

Question	Question	Resp	Action
1 (a)	Is the pesticide on the pesticide list (WAC 222-16-070(1))?	Yes No	go to 2 go to 1(b)
1 (b)	Is the pesticide being used under a Dept of Agriculture Experimental Use Permit (WAC 16-228-125)?	Yes No	Class III Class IV Sp
2	Is the toxicity rating for the pesticide to be used "Danger - Poison" as designated in the pesticide list (WAC 222-16-070(1)(b))?	Yes No	Class IV Sp go to 3(a)
3 (a)	Is Bacillus thuringiensis (BT) the only pesticide being used on this application?	Yes No	go to 3(b) go to 4(a)
3 (b)	Is there a Threatened or Endangered species or the critical habitat (Federal) or critical wildlife habitat (State) of a species within the application area that is susceptible to the BT strain being used?	Yes No	Class IV Sp Class III
4 (a)	Is this operation occurring over ground water with a high susceptibility to contamination as specified in EPA 910/ 9-87-189 or in documentation provided by the department of ecology?	Yes No	go to 4(b) go to 5(a)
4 (b)	Is this pesticide a state restricted use pesticide for the protection of ground water under WAC 16-228-164 (1)?	Yes No	Class IV Sp go to 5(a)
5 (a)	Is the operation adjacent (within 100 ft.) of surface water?	Yes No	go to 5(b) go to 5(e)
5 (b)	Determine the toxicity rating from the pesticide list: *Is the toxicity rating "Caution" or "Warning"? *Is the toxicity rating "Danger"?	Yes Yes	go to 5(c) go to 5(d)
5 (c)	Is there a Group A or B water surface water system (WAC 246-290-020) intake OR a fish hatchery intake within one half mile downstream of the operation?	Yes No	Class IV Sp go to 5(e)
5 (d)	Is there a Group A or B water surface system intake OR a fish hatchery intake within 1 mile downstream of the operation?	Yes No	Class IV Sp go to 5(e)
5 (e)	Is the operation within 200 feet of the intake of a Group A or B spring water system?	Yes No	Class IV Sp go to 5(f)
5 (f)	Is the operation applying a pesticide in a Type A or B wetland?	Yes No	Class IV Sp go to 6(a)
6 (a)	Does any portion of the planned operation cover 240 or more contiguous acres? Pesticide treatment units will be considered contiguous if they are separated by less than 300 feet or treatment dates of adjacent units are less than 90 days apart.	Yes No	Class IV Sp go to 6(b)
6 (b)	Is there a Threatened or Endangered species or the critical habitat (Federal) or critical wildlife habitat (State) of a species within the application area?	Yes No	Class IV Sp go to 6(c)

6 (c)	If there is a special concern identified for this pesticide in the Board manual, does it apply to this application?	Yes No	Class IV Sp Class III

5. At what point in the risk assessment process is the certainty level high enough to support the consideration of risk mitigation? What is the minimum level of technical information and scientific understanding that is necessary to evaluate whether risk mitigation would be necessary and/or effective?

When the LC50 for a given active ingredient indicates a potential hazard to aquatic organisms and in the absence of a risk assessment, then WSDA requires default mitigation measures (restrictions) on certain Section 18 requests. These mitigation measures are considered necessary in an effort to protect endangered species and expedite use approval by EPA and US Fish & Wildlife Service. When a Federally listed threatened or endangered species susceptible to the pesticide occurs in the county or counties where the use is being requested, the following restrictions must be incorporated into the request (unless the federal label has more restrictive requirements). WSDA may adjust buffer widths based on product characteristics and use rates, and will consider requests for different restrictions (e.g. alternative statements or mitigating measures, smaller buffer areas) if the registrant can provide information or data to demonstrate that endangered species will be adequately protected. Use of drift models (such as AgDrift) to develop product and equipment specific language is recommended.

The following default labeling statements are required when REQUESTING SECTION 18 EMERGENCY EXEMPTIONS FROM REGISTRATION IN WASHINGTON STATE
[URL reference = http://www.tricity.wsu.edu/~mantone/sec18gd.htm].

Toxicity rating / species	Method of Application
Highly to very highly toxic to fish or aquatic inverte-brates	To protect endangered aquatic species apply only when there is sustained wind away from fish-bearing waters or
	Ground: Leave a 25 foot untreated buffer between treatment area and fish-bearing waters, or use low pressure nozzles according to manufacturer's specifications that produce only coarse or very coarse droplets. **Airblast:** Leave a 50 foot (dormant) / 25 foot (foliated) untreated buffer between treatment area and fish-bearing waters. **Chemigation**: Leave a 50 foot untreated buffer between treatment area and fish-bearing waters. **Aerial** : Leave a 150 foot untreated buffer between treatment area and fish-bearing waters.
Moderately toxic to fish or aquatic invertebrates	To protect endangered aquatic species apply only when there is sustained wind away from fish-bearing waters or
	Ground: Leave a 10 foot untreated buffer between treatment area and fish-bearing waters, or use low pressure nozzles according to manufacturer's specifications that produce only coarse or very coarse droplets. **Airblast or Chemigation**: Leave a 25 foot untreated buffer between treatment area and fish-bearing waters. **Aerial** : Leave a 75 foot untreated buffer between treatment area and fish-bearing waters.
Non-toxic or slightly toxic to fish or aquatic inverte-brates, non-phytotoxic to plants	No special requirements for Ground, Airblast, Chemigation or Aerial Application:.
Phytotoxic to aquatic or terrestrial plants**	To protect endangered plant species apply only when there is sustained wind away from native plant communities or
	Ground: Leave a 25 foot untreated buffer between treatment area and native plant communities, or use low pressure nozzles according to manufacturer's specifications that produce only coarse or very coarse droplets. **Airblast:** Not applicable **Chemigation**: Leave a 50 foot untreated buffer between treatment area and native plant communities. **Aerial** : Leave a 150 foot untreated buffer between treatment area and native plant communities.

*Applications with backpack sprayers or other similar equipment are exempt from this requirement.

**An endangered species statement is not required if the plant is not susceptible to the herbicide (e.g. endangered plant species is a dicot and the herbicide is only active against monocot species).